

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Ikemoto et al.

Art Unit: Unassigned

Application No. Unassigned

Examiner: Unassigned

Filed: November 6, 2001

For: PRODUCTION METHOD OF 2-CYCLOHEXYL-2-HYDROXY-2-PHENYLACETIC ACID INTERMEDIATE THEREFOR AND PRODUCTION METHOD THEREOF

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

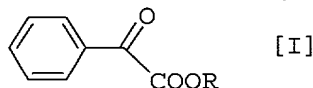
Dear Sir:

Prior to the examination of the above-identified patent application, please enter the following amendments and consider the following remarks.

AMENDMENTS

IN THE CLAIMS:

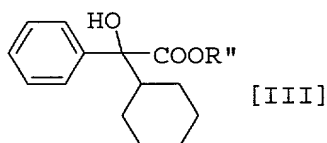
4. (Amended) A method for producing a compound of claim 1, which method comprising reacting a compound the formula [I]



wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, with cyclohexene in the presence of a Lewis acid.

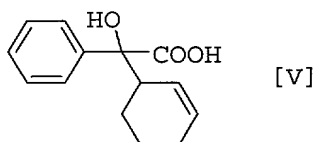
9. (Amended) The production method of claim 4, wherein the reaction is carried out in monochlorobenzene.

10. (Amended) A method for producing a compound of the formula [III]



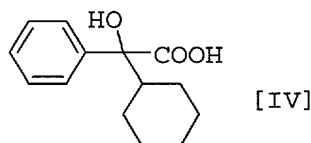
wherein R'' is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and (α -cyclohexyl- α -hydroxybenzyl)carbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form, which method comprises reducing a compound of claim 1.

12. (Amended) A method for producing a compound of the formula [V]



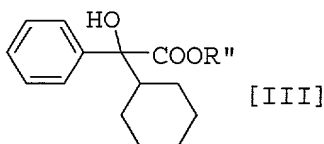
, an optically active form thereof or a salt thereof, which method comprises hydrolyzing a compound of claim 1.

15. (Amended) A method for producing 2-cyclohexyl-2-hydroxy-2-phenylacetic acid of the formula [IV]

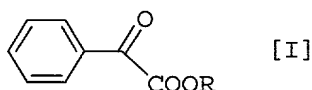


, an optically active form thereof or a salt thereof, which method comprises subjecting a compound of claim 1 to hydrolysis and reduction.

20. (Amended) A method for producing a compound of the formula [III]

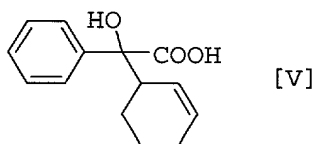


wherein R'' is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and (α -cyclohexyl- α -hydroxybenzyl)carbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, which method comprising reacting a compound the formula [I]

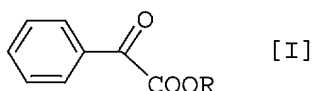


wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, with cyclohexene in the presence of a Lewis acid to give a compound of claim 1, and reducing the same.

22. (Amended) A method for producing a compound of the formula [V]

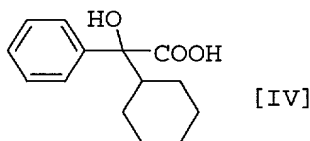


, an optically active form thereof or a salt thereof, which method comprises reacting a compound of the formula [I]

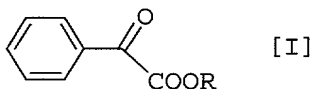


wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, with cyclohexene in the presence of a Lewis acid to give a compound of claim 1 and hydrolyzing the same.

24. (Amended) A method of producing 2-cyclohexyl-2-hydroxy-2-phenylacetic acid of the formula [IV]



, an optically active form thereof or a salt thereof, which method comprises reacting a compound of the formula [I]



wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, with cyclohexene in the presence of a Lewis acid to give a compound of claim 1, and subjecting the same to hydrolysis and reduction.

REMARKS

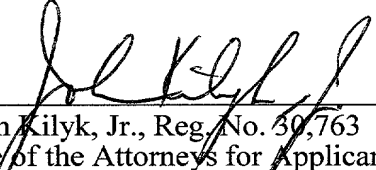
The claims have been amended to remove multiple dependencies and to place the claims in a format more consistent with U.S. patent practice. No substantive amendments have been

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Application No. Unassigned

made to the claims, and the scope of the claims was not altered. Accordingly, no new matter has been added by way of these claim amendments.

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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Date: November 6, 2001

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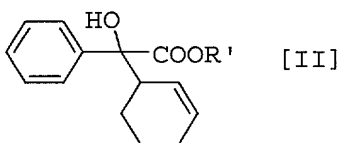
Art Unit: Unassigned

Examiner: Unassigned

For: PRODUCTION METHOD OF 2-CYCLOHEXYL-2-HYDROXY-2-PHENYLACETIC ACID
INTERMEDIATE THEREFOR AND PRODUCTION
METHOD THEREOF

PENDING CLAIMS AFTER ENTRY OF PRELIMINARY AMENDMENT

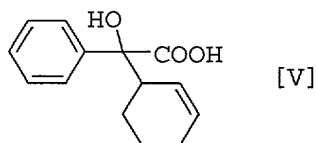
1. A compound of the formula [II]



wherein R' is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and (α -(2-cyclohexen-1-yl)- α -hydroxy-benzyl)carbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl, or an optically active form thereof.

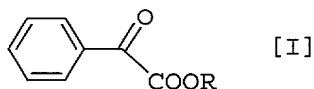
2. The compound of claim 1, wherein R' is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl and norbornyl, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl, or an optically active form thereof.

3. A compound of the formula [V]



, an optically active form thereof or a salt thereof.

4. A method for producing a compound of claim 1, which method comprising reacting a compound the formula [I]



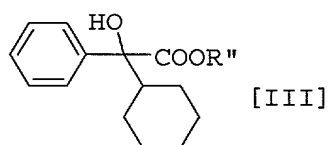
wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, with cyclohexene in the presence of a Lewis acid.

5. The production method of claim 4, wherein R and R' are each linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl and norbornyl, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl.

6. The production method of claim 4, wherein R and R' are each a group having an asymmetric carbon atom.

7. The production method of claim 4, wherein the Lewis acid is an optically active Lewis acid having an asymmetric ligand.

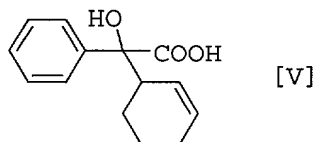
8. The production method of claim 4, wherein the Lewis acid is titanium tetrachloride.
9. The production method of claim 4, wherein the reaction is carried out in monochlorobenzene.
10. A method for producing a compound of the formula [III]



wherein R'' is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and (α -cyclohexyl- α -hydroxybenzyl)carbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form, which method comprises reducing a compound of claim 1.

11. The production method of claim 10, wherein R' and R'' are each linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl and norbornyl, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl.

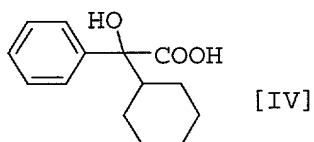
12. A method for producing a compound of the formula [V]



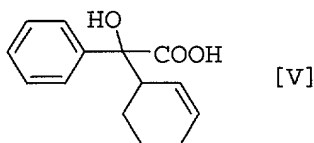
, an optically active form thereof or a salt thereof, which method comprises hydrolyzing a compound of claim 1.

13. The production method of claim 12, wherein R' is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl and norbornyl, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl.

14. A method for producing 2-cyclohexyl-2-hydroxy-2-phenylacetic acid of the formula [IV]

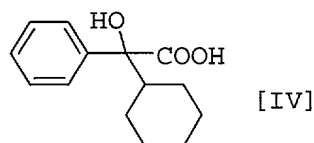


, an optically active form thereof or a salt thereof, which method comprising reducing a compound of the formula [V]



, an optically active form thereof or a salt thereof.

15. A method for producing 2-cyclohexyl-2-hydroxy-2-phenylacetic acid of the formula [IV]



, an optically active form thereof or a salt thereof, which method comprises subjecting a compound of claim 1 to hydrolysis and reduction.

16. The production method of claim 15, wherein R' is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl and norbornyl, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least

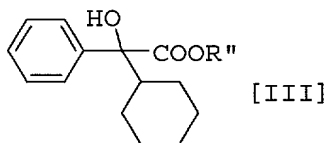
one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl.

17. The production method of claim 15, which comprises simultaneous hydrolysis and reduction.

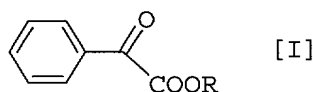
18. The production method of claim 15, which comprises hydrolysis after reduction.

19. The production method of claim 15, which comprises reduction after hydrolysis.

20. A method for producing a compound of the formula [III]



wherein R'' is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and (α -cyclohexyl- α -hydroxybenzyl)carbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, which method comprising reacting a compound the formula [I]

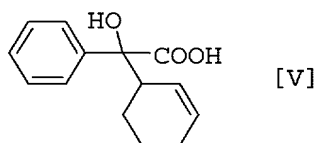


wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, with

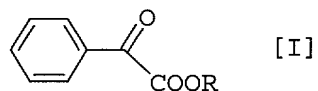
cyclohexene in the presence of a Lewis acid to give a compound of claim 1, and reducing the same.

21. The production method of claim 20, wherein R' and R'' are each linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl and norbornyl, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl.

22. A method for producing a compound of the formula [V]



, an optically active form thereof or a salt thereof, which method comprises reacting a compound of the formula [I]

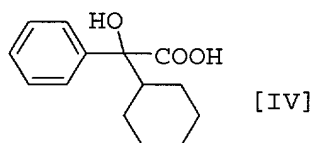


wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, with cyclohexene in the presence of a Lewis acid to give a compound of claim 1 and hydrolyzing the same.

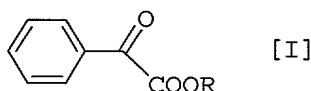
23. The production method of claim 22, wherein R and R' are each linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl and norbornyl, or cyclohexyl, cyclopentyl or norbornyl, which is optionally

substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl.

24. A method of producing 2-cyclohexyl-2-hydroxy-2-phenylacetic acid of the formula [IV]



, an optically active form thereof or a salt thereof, which method comprises reacting a compound of the formula [I]



wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, with cyclohexene in the presence of a Lewis acid to give a compound of claim 1, and subjecting the same to hydrolysis and reduction.

25. The production method of claim 24, wherein R and R' are each linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl and norbornyl, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl.

26. The production method of claim 24, which comprises simultaneous hydrolysis and reduction.

27. The production method of claim 24, which comprises hydrolysis after reduction.

28. The production method of claim 24, which comprises reduction after hydrolysis.

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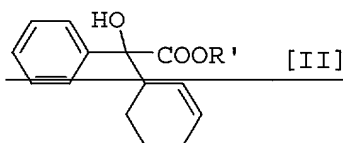
For: PRODUCTION METHOD OF 2-CYCLOHEXYL-2-HYDROXY-2-PHENYLACETIC ACID
INTERMEDIATE THEREFOR AND PRODUCTION
METHOD THEREOF

AMENDMENTS TO CLAIMS MADE VIA PRELIMINARY AMENDMENT

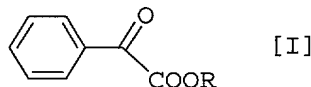
*(Deletions to the claims are indicated by cross-out text,
while additions are indicated by underlined text)*

IN THE CLAIMS:

4. (Amended) A method for producing a compound of ~~the formula [II]~~



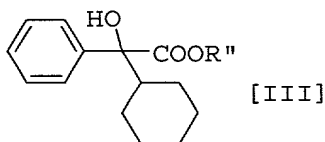
wherein ~~R' is as defined in claim 1, or an optically active form thereof~~, which method comprising reacting a compound the formula [I]



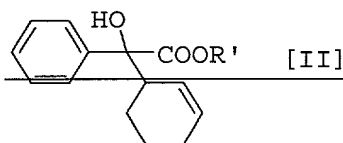
wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form thereof, with cyclohexene in the presence of a Lewis acid.

9. (Amended) The production method of ~~any of claims claim 4 to 8~~, wherein the reaction is carried out in monochlorobenzene.

10. (Amended) A method for producing a compound of the formula [III]

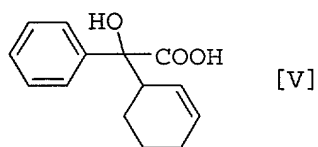


wherein R'' is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and (α -cyclohexyl- α -hydroxybenzyl)carbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl or an optically active form, which method ~~comprising~~ comprises reducing a compound of ~~the formula [II]~~

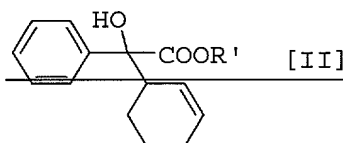


~~wherein R' is as defined in claim 1, or an optically active form thereof.~~

12. (Amended) A method for producing a compound of the formula [V]

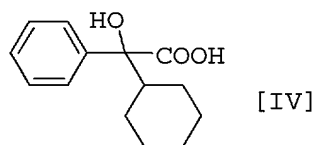


, an optically active form thereof or a salt thereof, which method ~~comprising~~ hydrolyzing a compound of ~~the formula [II]~~

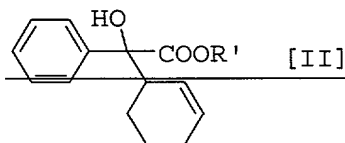


~~wherein R' is as defined in claim 1, or an optically active form thereof.~~

15. (Amended) A method for producing 2-cyclohexyl-2-hydroxy-2-phenylacetic acid of the formula [IV]

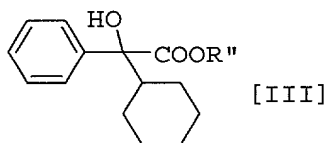


, an optically active form thereof or a salt thereof, which method ~~comprising~~ comprises ~~subjecting a compound of the formula [II]~~

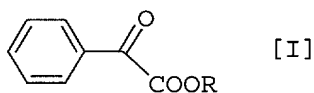


~~wherein R' is as defined in claim 1, or an optically active form thereof, to hydrolysis and reduction.~~

20. (Amended) A method for producing a compound of the formula [III]

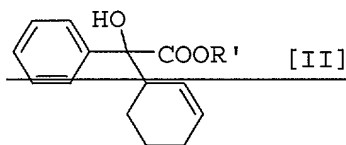


wherein R'' is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and (α-cyclohexyl-α-hydroxybenzyl)carbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl as defined in claim 10, or an optically active form thereof, which method comprising reacting a compound the formula [I]



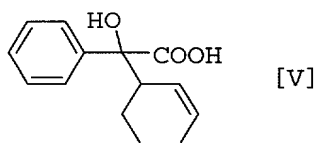
wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain

alkyl having 1 to 15 carbon atom(s) and phenyl as defined in claim 4, or an optically active form thereof, with cyclohexene in the presence of a Lewis acid to give a compound of ~~the~~ formula [II]

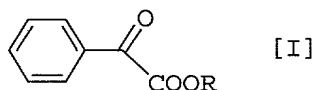


wherein R' is as defined in claim 1, or an optically active form thereof, and reducing the same.

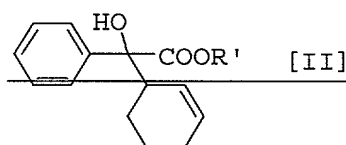
22. (Amended) A method for producing a compound of the formula [V]



, an optically active form thereof or a salt thereof, which method ~~comprising~~ comprises reacting a compound of the formula [I]

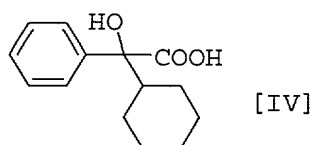


wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl as defined in claim 4, or an optically active form thereof, with cyclohexene in the presence of a Lewis acid to give a compound of ~~the~~ formula [II]

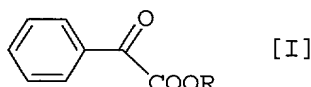


wherein R' is as defined in claim 1, or an optically active form thereof, and hydrolyzing the same.

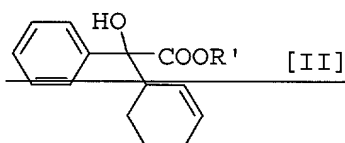
24. (Amended) A method of producing 2-cyclohexyl-2-hydroxy-2-phenylacetic acid of the formula [IV]



, an optically active form thereof or a salt thereof, which method ~~comprising~~ comprises reacting a compound of the formula [I]



wherein R is linear or branched chain alkyl having 1 to 15 carbon atom(s), which is optionally substituted by at least one substituent selected from the group consisting of phenyl, naphthyl, cyclohexyl, cyclopentyl, norbornyl, methoxycarbonyl, ethoxycarbonyl and benzoylcarbonyloxy, or cyclohexyl, cyclopentyl or norbornyl, which is optionally substituted by at least one substituent selected from the group consisting of linear or branched chain alkyl having 1 to 15 carbon atom(s) and phenyl as defined in claim 4, or an optically active form thereof, with cyclohexene in the presence of a Lewis acid to give a compound of ~~the~~ formula [II]



~~wherein R' is as defined in claim 1, or an optically active form thereof,~~ and subjecting the same to hydrolysis and reduction.